

A new species of *Anatextrix* Kaya, Zamani, Yağmur & Marusik, 2023 (Araneae, Agelenidae, Tetracini) from southern Türkiye, with a remarkable morphology of the male palpal femur

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<https://zoobank.org/07CC7326-D124-47B8-9341-2BB7501AE86B>

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Academic editor: Danilo Harms ♦ Received 22 March 2023 ♦ Accepted 16 May 2023 ♦ Published 25 May 2023

Abstract

Anatextrix monstrabilis **sp. nov.** (Araneae: Agelenidae) is described and illustrated, based on male and female specimens collected from Adana Province, Türkiye. The new species has an L-shaped male palpal femur bearing multiple apophyses, which is a rare trait in spiders. *Anatextrix monstrabilis* **sp. nov.** is the second species of the recently described genus *Anatextrix* Kaya, Zamani, Yağmur & Marusik, 2023, currently known only from southern Türkiye.

Key Words

Adana, Ageleninae, Anatolia, Aranei, Mediterranean Region

Introduction

The funnel-weaver spider family Agelenidae C.L. Koch, 1837 is one of the most diverse families of spiders, currently comprising 93 genera and 1375 extant species in the subfamilies Ageleninae C.L. Koch, 1837 and Coelotinae F.O. Pickard-Cambridge, 1893 (Lehtinen 1967; WSC 2023). According to Lehtinen (1967), Ageleninae is subdivided into four tribes, including Tetracini Lehtinen, 1967 which comprises four genera and more than 30 species primarily distributed in the Mediterranean Region. *Anatextrix* Kaya, Zamani, Yağmur & Marusik, 2023 — the most recently described genus of Tetracini — is currently known only from southern Türkiye, a region with a

high degree of endemism and a particularly high diversity of agelenids (Kaya et al. 2023).

Anatextrix was described by Kaya et al. (2023), with *A. spectabilis* Kaya, Zamani, Yağmur & Marusik, 2023 (from Mersin and Adana provinces of Türkiye) as its type species. The genus is characterised by a strongly modified male palpal femur bearing several processes/outgrowths, palpal patellar apophysis and a cymbial prolateral fold in males, and a thin septum and a lack of fovea or scape in females.

We recently found specimens of another species of this genus amongst the material collected in southern Türkiye. The new species displays a remarkable morphology of the male palpal femur and represents the second species of *Anatextrix*.

Materials and methods

Specimens were collected using a hand aspirator and preserved in 70% ethanol. Photographs were taken by a Canon EOS 7D camera attached to an Olympus SZX16 stereomicroscope at the Zoological Museum of the University of Turku. Digital images were montaged using Combine ZP and edited using CorelDraw graphic design software programme. Illustrations of internal genitalia were made after clearing and cleaning the epigyne in a 10% potassium hydroxide (KOH) aqueous solution, followed by a few minutes of treatment in Chlorazol Black. Lengths of leg segments were measured on the dorsal side and are listed as: total length (femur, patella, tibia, metatarsus, tarsus). All measurements are in millimetres (mm). Spination formula follows Bolzern et al. (2008, 2009).

The following abbreviations are used in the text and figures:

Eyes: **ALE** – anterior lateral eye, **AME** – anterior median eye, **PLE** – posterior lateral eye, **PME** – posterior median eye. Spination: **d** – dorsal, **Fe** – femur, **Mt** – metatarsus, **Pa** – patella, **pl** – prolateral, **rl** – retrolateral, **Ti** – tibia, **v** – ventral.

Male palp: **Ca** – anterior arm of conductor, **Cf** – cymbial fold, **Cp** – posterior arm of conductor, **Ct** – ventral tip of conductor, **Db** – distal bulge, **Dc** – dorsal extension of conductor, **Eb** – base of embolus, **Kt** – ventral keel, **Pb** – proximal bulge, **Pt** – prolateral apophysis, **Rt** – retrolateral apophysis, **So** – stump-like outgrowth, **Sp** – spine-like outgrowth, **Va** – ventral apophysis.

Epigyne: **Cd** – copulatory duct, **Fd** – fertilisation duct, **Oc** – copulatory opening, **Re** – receptacle, **Se** – septum.

The specimens are deposited in the following collections:

- AZMM** Alaşehir Zoological Museum of Manisa Celal Bayar University, Türkiye (E.A. Yağmur);
ZMUT Zoological Museum of the University of Turku, Finland (V. Vahtera);
ZMUU Zoological Museum of the Bursa Uludağ University, Türkiye (R.S. Kaya).

Results

Taxonomy

Family Agelenidae C.L. Koch, 1837

Subfamily Ageleninae C.L. Koch, 1837

Tribe Textricini Lehtinen, 1967

Genus *Anatextrix* Kaya, Zamani, Yağmur & Marusik, 2023

Type species. *Anatextrix spectabilis* Kaya, Zamani, Yağmur & Marusik, 2023 from southern Anatolia, by monotypy.

Emended diagnosis. The genus differs from all other genera of Textricini by having a strongly modified male palpal femur bent at the proximal or middle part with two digitiform outgrowths (*So* and *Sp*) and at least one proximal bulge (vs. not bent, with none or subdistal bulge), presence of the palpal prolateral tibial apophysis (*Pt*) and the cymbial baso-prolateral fold (*Cf*) (vs. lacking), straight mesal part of the embolic base (*Eb*) (vs. round) and a thin septum in the epigyne (vs. absent). Furthermore, the females of *Anatextrix* differ from those of *Textrix* Sundevall, 1833 by having no epigynal fovea and scape (vs. present). From the females of the two other genera of Textricini – *Maimuna* Lehtinen, 1967 and *Lycosoides* Lucas, 1846 – the females of *Anatextrix* differ by the anterior position of the receptacles (vs. mesal or posterior).

Composition. Two species: *A. spectabilis* and *A. monstrabilis* sp. nov.

Distribution. Southern Türkiye (Fig. 7).

***Anatextrix monstrabilis* sp. nov.**

<https://zoobank.org/4EB359F3-3CFE-4016-BE35-97A91C6E8D85>

Figs 1A, B, 2A–E, 3A–E, 4A–F, 5A–E

Type material. **Holotype** ♂ (ZMUU), TÜRKİYE: Adana Province: Pozantı District, Akçatekir Village, 37°19'29"N, 34°46'33"E, 1336 m elev., 27.09.2018, hand collection (R.S. Kaya and E.A. Yağmur); **Paratypes:** 1♂2♀ (ZMUT), same data as for the holotype; 2♂2♀ (AZMM), same data as for the holotype; 10♂12♀ (ZMUU), same data as for the holotype.

Etymology. The specific epithet is derived from the Latin “*monstrabilis*”, meaning “remarkable, excellent”.

Diagnosis. The new species differs from the genotype, *A. spectabilis*, by having the male palpal femur bent at a right angle at the mesal part (vs. slightly bent at distal part), having no distal bulge (vs. present), a less protruding tip of the conductor (*Ct*) and a smaller dorsal extension of the conductor (*Dc*) (cf. Fig. 2A, F). The female of the new species differs from that of *A. spectabilis* by having diverging copulatory ducts (*Cd*) (vs. parallel; cf. Fig. 5A, F).

Description. Male (holotype). Habitus as in Fig. 1B. Total length 6.28. Carapace 3.17 long, 1.03 wide at pars cephalica, 2.18 wide at pars thoracica. Eye sizes: AME: 0.10, ALE: 0.14, PME: 0.20, PLE: 0.14. Carapace, sternum, labium and maxillae light brown; carapace with darker submedian bands. Chelicerae light reddish brown, with 3 pro- and 2 retromarginal teeth. Legs yellowish brown, with annulations. Abdomen dorsally dark greyish with lighter foliate pattern, light greyish ventrally. Spinnerets light greyish, darker basally. Measurements of legs: I: 7.04 (1.87, 0.88, 1.43, 1.74, 1.12), II: 7.06 (1.92, 0.89, 1.39, 1.78, 1.08), III: 7.09 (1.90, 0.85, 1.34, 1.90, 1.10), IV: 8.85 (2.25, 0.89, 1.78, 2.67, 1.26). Spination as shown in Table 1.

Palp as in Figs 2A–E, 3A–E, 4A–F; femur strongly modified, bent at right angle in mid-part, with proximal

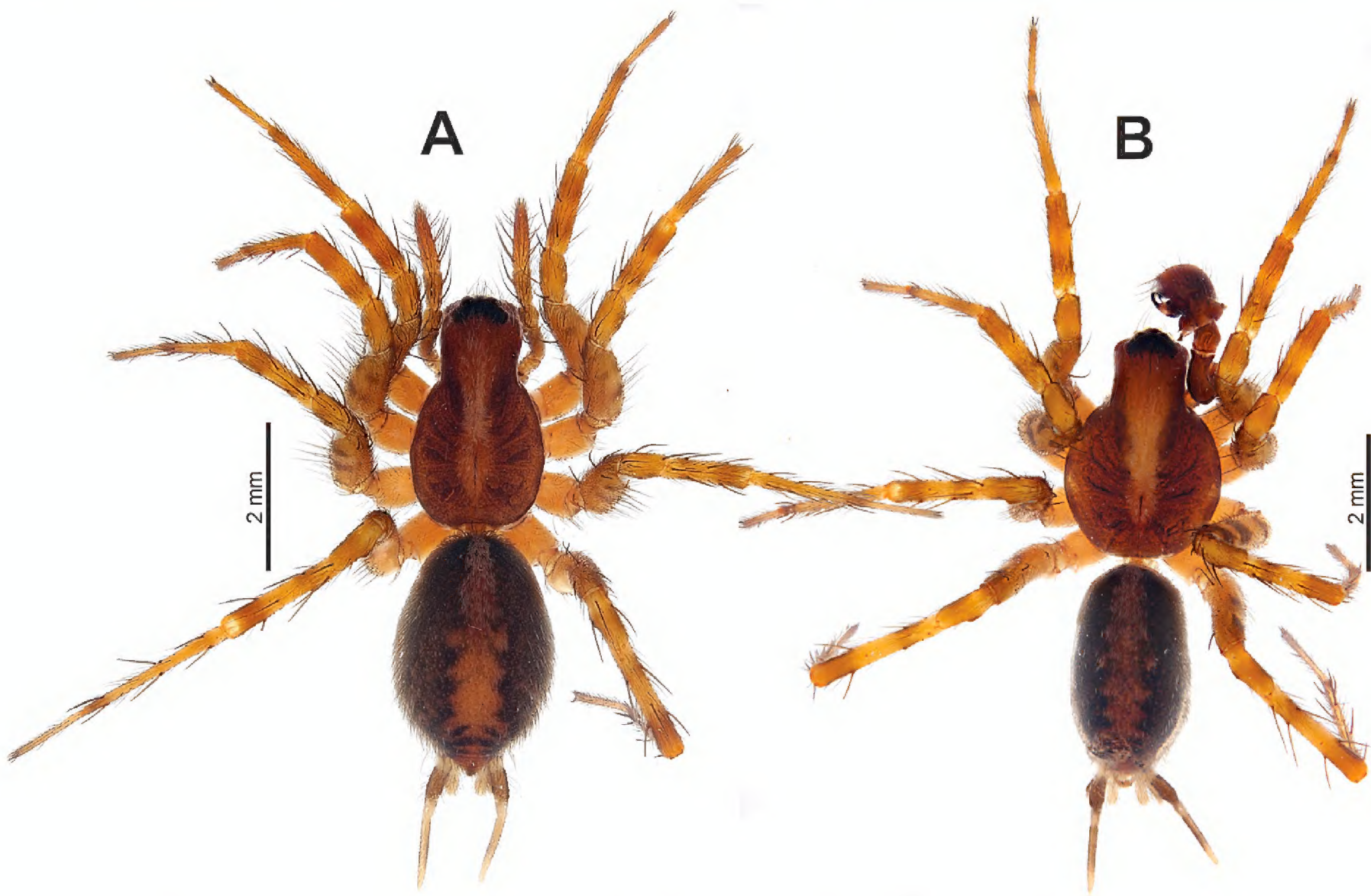


Figure 1. Female (A) and male (B) of *Anatextrix monstrabilis* sp. nov., dorsal view of the habitus.

bulge (*Pb*) and two digitiform outgrowths (*So* and *Sp*); patella with ventral apophysis (*Va*); tibial about as long as wide, with small retrolateral apophysis extended retro-laterally (*Rt*) and ventral keel (*Kt*); tip of conductor with three processes in lateral view (Fig. 2A, C).

Female (paratype, ZMUT). Habitus as in Fig. 1A. Total length 6.33. Carapace 3.02 long, 1.01 wide at pars cephalica, 1.80 wide at pars thoracica. Eye sizes: AME: 0.10, ALE: 0.13, PME: 0.21, PLE: 0.15. Colouration as in male. Measurements of legs: I: 6.00 (1.59, 0.76, 1.23, 1.49, 0.93), II: 5.89 (1.62, 0.80, 1.14, 1.44, 0.89), III: 6.15 (1.69, 0.79, 1.19, 1.52, 0.96), IV: 7.95 (2.07, 0.85, 1.68, 2.26, 1.09). Spination as shown in Table 1.

Epigyne as in Fig. 5A–E; septum (*Se*) well distinct in posterior part; copulatory ducts (*Cd*) subparallel posteriorly and diverging anteriorly; receptacles (*Re*) elongated, ca. 3 times longer than wide, located anteriorly.

Table 1. Leg spination of *Anatextrix monstrabilis* sp. nov. The letter “p” indicates paired spines.

		Fe	Pa	Ti	Mt
		d-pl-rl	d-pl-rl	d-pl-rl-v	pl-rl-v
I	♂	3-1-1	2-1-1	1-2-1-1+1p	2-1-3p
	♀	3-1-1	2-1-1	1-2-1-1+1p	2-1-3p
II	♂	3-1-1	2-1-1	1-2-0-2	2-1-3p
	♀	3-1-1	2-1-1	1-2-1-2+1p	2-1-3p
III	♂	3-1-1	2-1-1	1-2-1-2	3-3-3p
	♀	3-1-1	2-1-1	2-2-2-2+1p	3-3-3p
IV	♂	3-1-1	2-1-1	1-2-1-2+1p	3-2-3p
	♀	3-1-1	2-1-1	2-2-2-2+1p	3-3-3p

Natural history. The type locality of the new species is located in the Eastern Taurus Mountain range. This species inhabits montane forests dominated by Taurus fir (*Abies cilicica* Carr.). All examined specimens were collected from their funnel-webs constructed under the rocks, crevices in the soil and trunks of fallen trees, in rocky areas along the forest (Fig. 6B).

Distribution. Known only from the type locality in Adana Province, southern Türkiye (Fig. 7).

Discussion

This paper describes and illustrates a new species of *Anatextrix*, representing the second species of this recently-established genus, which is currently known only from southern Türkiye. It seems that the species of *Anatextrix* primarily occur in montane forests (Fig. 6A, B).

Both currently-known species of this genus have been collected in closely-situated localities in the Taurus Mountains, a biodiversity hotspot that separates the Mediterranean coastal region from the central Anatolian Plateau (Noroozi et al. 2019). A higher diversity of *Anatextrix* is expected in this region, as mountain complexes, such as the Taurus, form barriers that contribute to the separation of populations and speciation (Çıplak 2003). Anatolian Agelenids demonstrate a very high degree of endemism: most species have restricted, local distributions and occur at high altitudes in mountainous areas (Kaya et al. 2010). This pattern of distribution is an indication of the important role of topography in the faunal evolution in this region (Çıplak 2003).

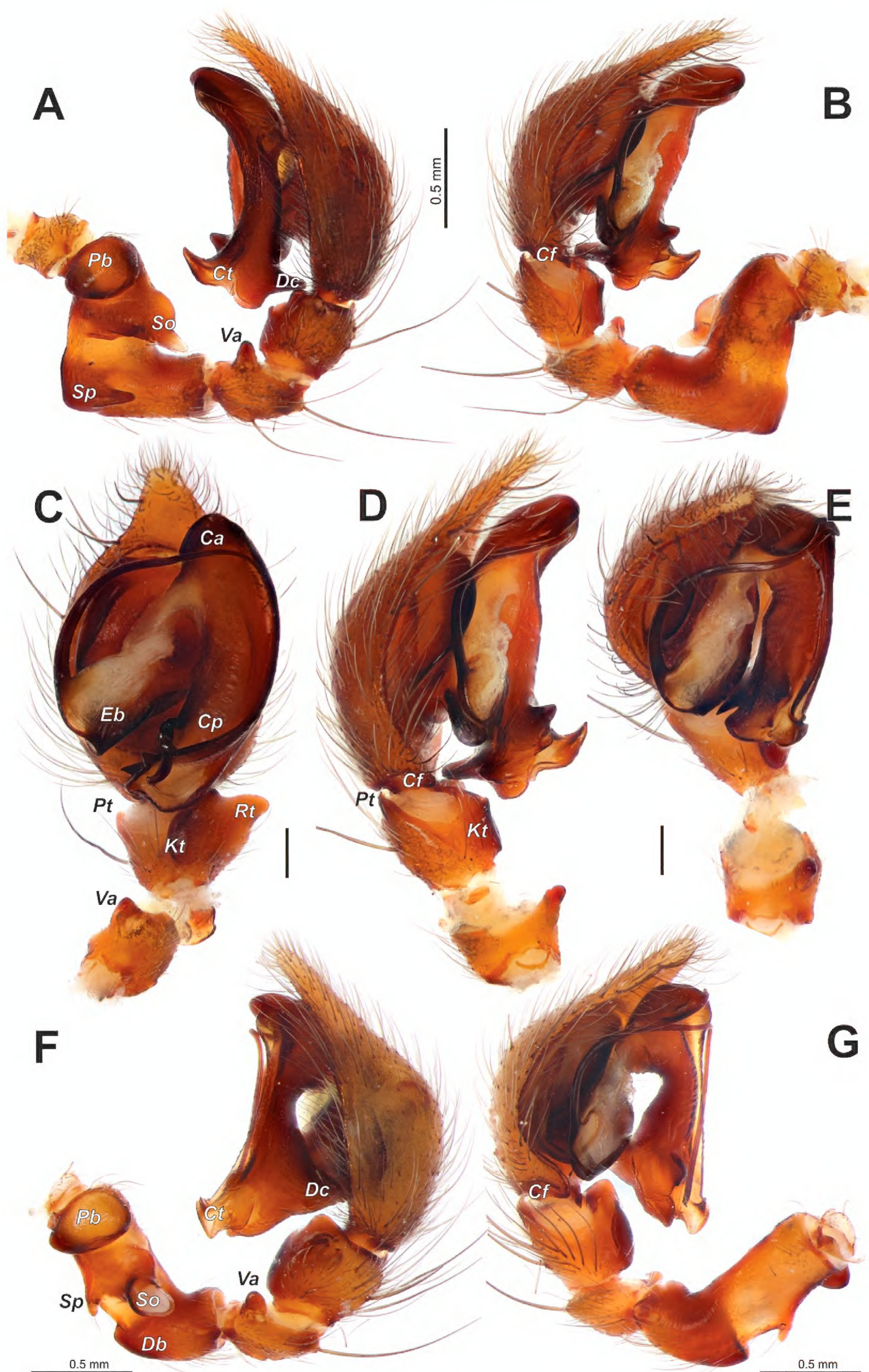


Figure 2. Male palps of *Anatextrix monstrabilis* sp. nov. (A–E) and *A. spectabilis* (F, G). A, F. Full palp, retrolateral view; B, G. Same, prolateral view; C–E. Palp with femur detached, ventral, prolateral and anterior views. Scale bars: 0.2 mm, unless stated otherwise. Abbreviations: Ca – anterior arm of conductor, Cf – cymbial fold, Cp – posterior arm of conductor, Ct – ventral tip of conductor, Db – distal bulge, Dc – dorsal extension of conductor, Eb – base of embolus, Kt – ventral keel, Pb – proximal bulge, Pt – prolateral apophysis, Rt – retrolateral apophysis, So – stump-like outgrowth, Sp – spine-like outgrowth, Va – ventral apophysis. F and G are reproduced from Kaya et al. (2023).

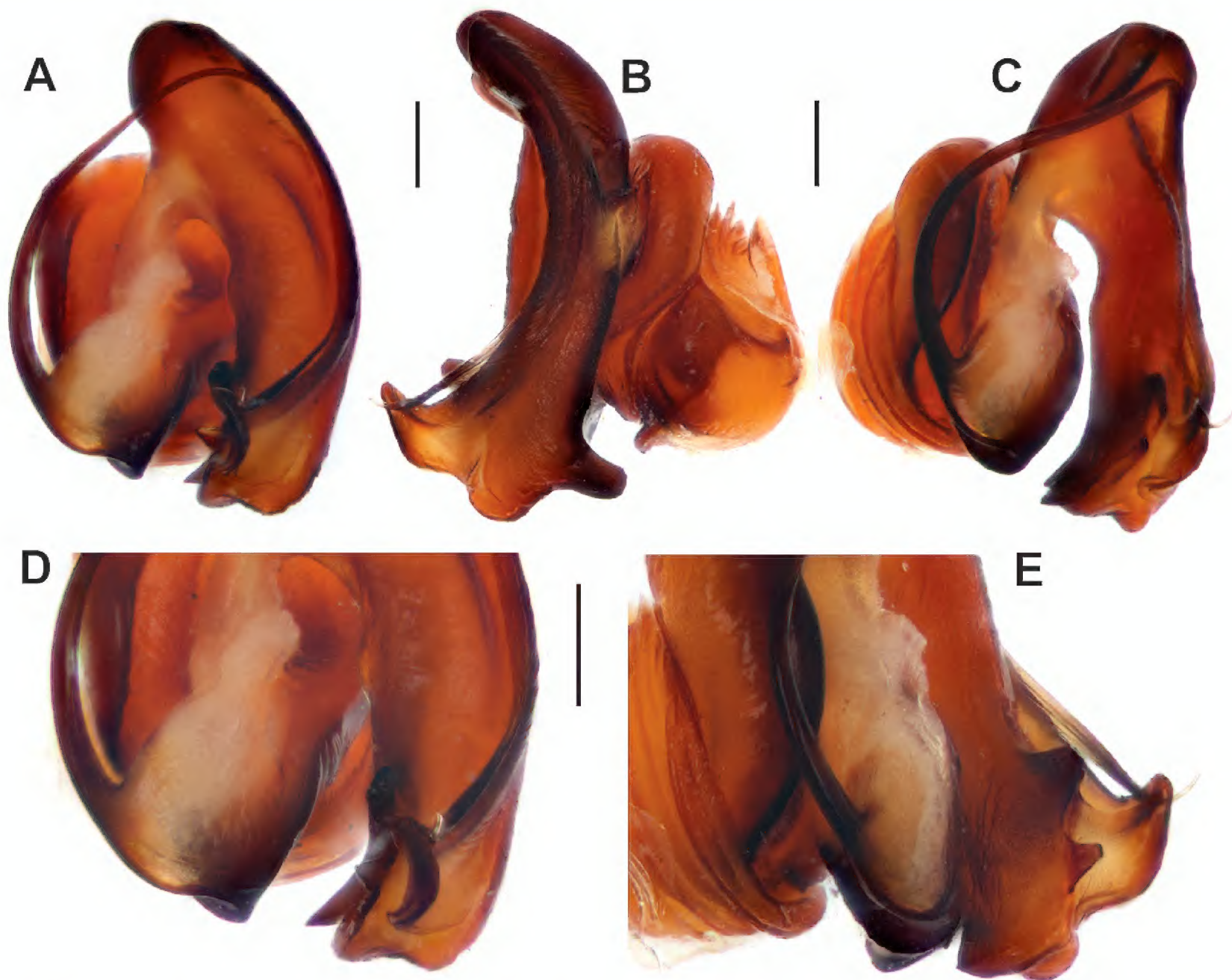


Figure 3. Bulb of *Anatextrix monstrabilis* sp. nov. **A, D.** Ventral view; **B.** Retrolateral view; **C.** Proventral view; **E.** Prolateral view. Scale bars: 0.2 mm.

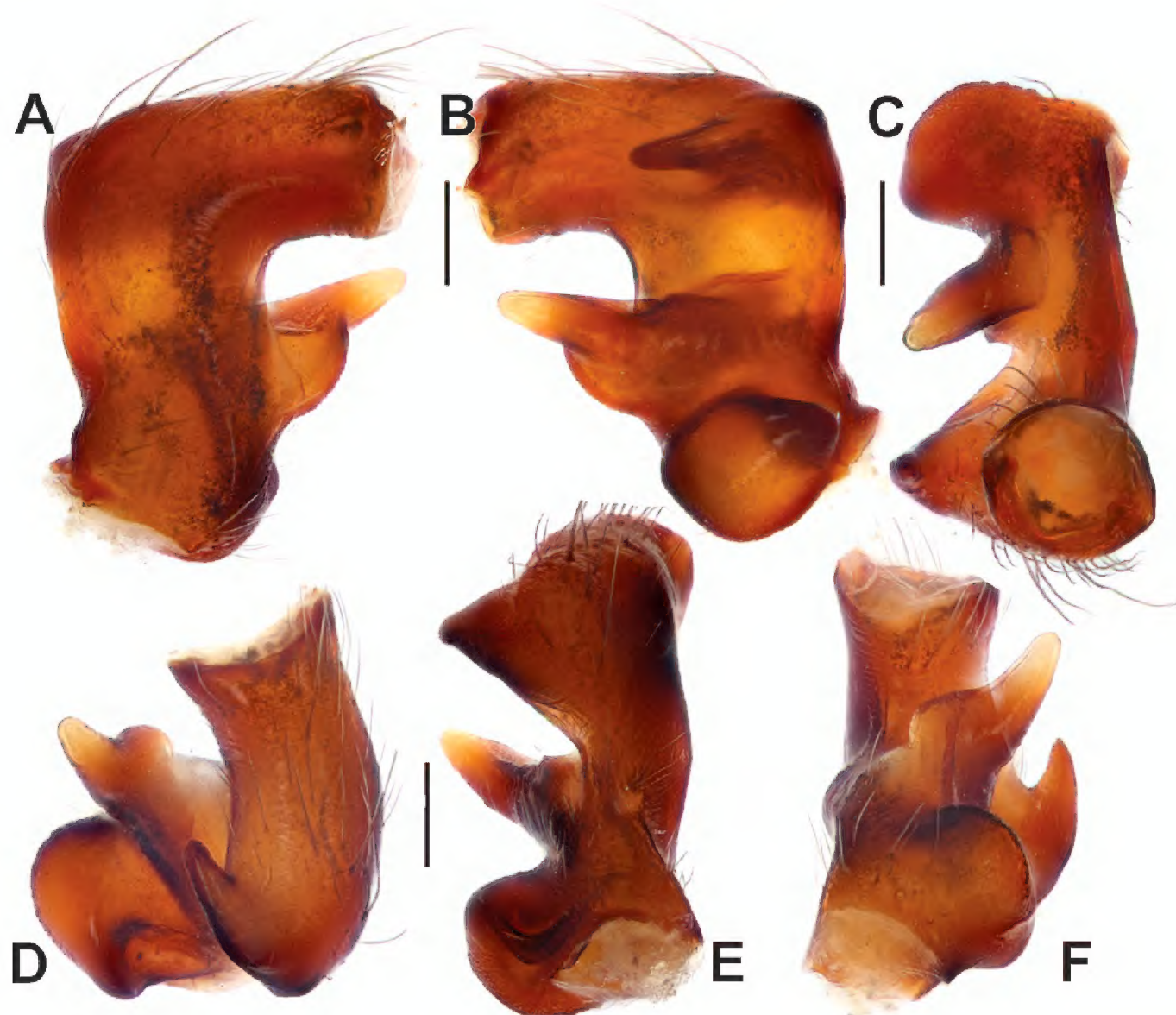


Figure 4. Male palpal femur of *Anatextrix monstrabilis* sp. nov. **A.** Prolateral view; **B.** Retrolateral view; **C.** Ventral view; **D.** Anterior view; **E.** Dorsal view; **F.** Posterior view. Scale bars: 0.2 mm.

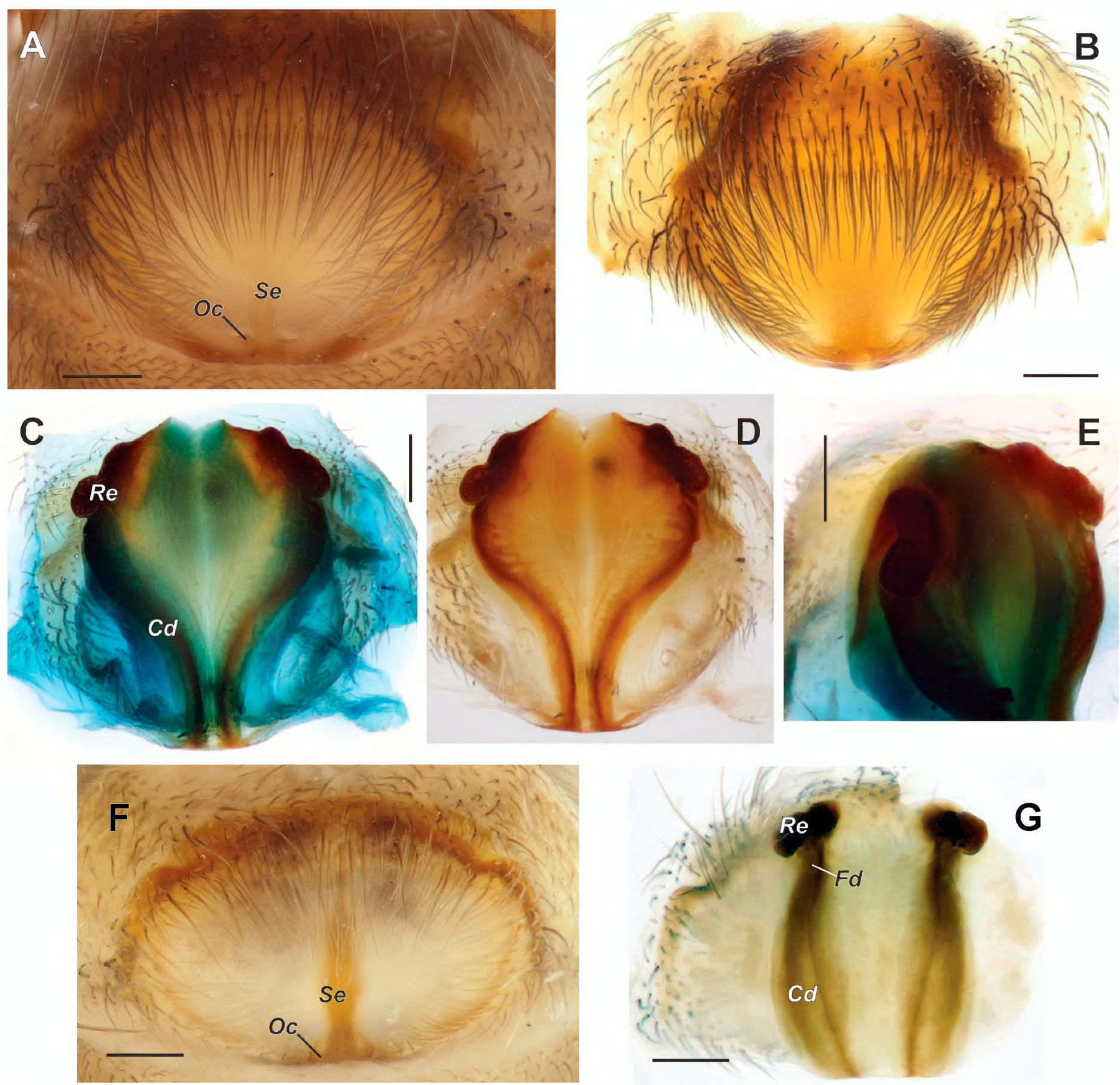


Figure 5. Epigynes of *Anatextrix monstrabilis* sp. nov. (A–E) and *A. spectabilis* (F, G). A, F. Intact epigyne, ventral view; B. Macerated epigyne, ventral view; C, D, G. Vulva, dorsal view; E. Same, dorsolateral view. Scale bars: 0.2 mm. Abbreviations: Cd – copulatory duct, Fd – fertilisation duct, Oc – copulatory opening, Re – receptacle, Se – septum. F and G are reproduced from Kaya et al. (2023).



Figure 6. Habitats of species of *Anatextrix* in Pozantı district of Adana Province, Türkiye. A. Habitat of *A. spectabilis* in Armutoğlu; B. Habitat of *A. monstrabilis* sp. nov. in Akçatekir.



Figure 7. Distribution records of *Anatextrix spectabilis* (circles) and *A. monstrabilis* sp. nov. (square).

The most interesting and remarkable characteristic of the new species described in this paper is the highly-modified male palpal femur, which is a relatively rare trait in spiders. Although the generotype of *Anatextrix* also displays a modified male palpal femur, the morphology of this segment is more remarkable in the new species (i.e., more distinctly L-shaped and bearing larger outgrowths). To the best of our knowledge, the combination of these two characters is unknown in any other species of spiders.

Generally speaking, male spiders use the apophyses on their palps or first pair of legs during copulation. Palpal apophyses (particularly the retrolateral tibial apophysis) are used to stabilise the palp on the epigyne (Huber 1995) or, in some cases, they are ‘locked’ into parts of the bulb, while apophyses of the legs are hooked to the chelicerae or appendages of the female to prevent her from attacking the male (Pérez-Miles and Perafán 2017). The morphology of these structures is often species-specific and widely believed to be shaped by sexual selection (Huber 1995). We believe that the mating behaviour of the species of *Anatextrix* should be an interesting case to study, as the large and numerous apophyses of the male palpal femur are likely to play a role in the copulation.

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